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TXX-15141

Ref. # 10CFR50.73

December 1, 2015

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT
DOCKET NO. 50-446
LICENSEE EVENT REPORT 446/15-002-00
REACTOR TRIP DUE TO FEEDWATER FLOW CONTROLLER MALFUNCTION

Dear Sir or Madam:

Enclosed is Licensee Event Report (LER) 446/15-002-00, "Reactor Trip Due To Feedwater Flow Controller Malfunction" for Comanche Peak Nuclear Power Plant (CPNPP) Unit 2.

This communication contains no new licensing basis commitments regarding Comanche Peak Unit 2. Should you have any questions, please contact Mr. Gary Merka at (254) 897-6613.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By:

Thomas P. McCool
Vice President, Engineering and Support

Enclosure

c - Marc L. Dapas, Region IV
Balwant K. Singal, NRR
Resident Inspectors, CPNPP

IE22
NRR



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Comanche Peak Nuclear Power Plant Unit 2

2. DOCKET NUMBER

05000 446

3. PAGE

1 OF 4

4. TITLE

Unit 2 Manual Reactor Trip Due To Feedwater Flow Controller Malfunction

5. EVENT DATE

MONTH	DAY	YEAR
10	03	2015

6. LER NUMBER

YEAR	SEQUENTIAL NUMBER	REV NO.
2015	002	00

7. REPORT DATE

MONTH	DAY	YEAR
12	01	2015

8. OTHER FACILITIES INVOLVED

FACILITY NAME	DOCKET NUMBER
	05000
FACILITY NAME	DOCKET NUMBER
	05000

9. OPERATING MODE

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
43	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Tim Hope - Regulatory Affairs Manager

TELEPHONE NUMBER (Include Area Code)

(254) 897-6370

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	SJ	FCV		Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 3, 2015, Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 was in Mode 1 operating at approximately 43% power shutting down for the 15th refueling outage. During the shutdown, a Steam Generator (SG) 2-03 level deviation alarm was received. Manual control of the SG 2-03 Feedwater flow control valve was taken, but Operators were unable to control feed flow. At 0958, a manual reactor trip was initiated in anticipation of an automatic turbine trip at the P-14 setpoint. The Motor Driven Auxiliary Feedwater (AFW) pumps were manually started per Operations procedures to control AFW flow, minimize cool down, and maintain SG levels. All systems responded normally during and following the reactor trip.

The cause of this event was determined to be a manufacturing defect in the SG 2-03 feedwater flow control valve positioner upper O-ring. Corrective actions include replacement of all four Unit 2 feedwater flow control valve positioners and establishment of periodic monitoring of feedwater flow control valve demand as an early detection of a positioner failure.

All times in this report are approximate and Central Time unless noted otherwise.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Comanche Peak Nuclear Power Plant Unit 2	05000 446	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 4
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NARRATIVE**I. DESCRIPTION OF THE REPORTABLE EVENT****A. REPORTABLE EVENT CLASSIFICATION**

This event is reportable under 50.73(a)(2)(iv)(A) "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." The systems that actuated included the Reactor Protection System and the Auxiliary Feedwater System.

This event is not reportable per 10CFR21 because the degraded SG 2-03 feedwater flow control valve positioner upper O-ring was not designed and manufactured under a quality assurance program complying with 10CFR50, Appendix B.

B. PLANT CONDITION PRIOR TO EVENT

At 0958 on October 3, 2015, Comanche Peak Nuclear Power Plant (CPNPP) Unit 2 was in MODE 1 operating at approximately 43% power shutting down for the 15th refueling outage.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no inoperable structures, systems or components that contributed to the event.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On October 3, 2015, CPNPP Unit 2 was operating at approximately 43% while shutting down for the 15th refueling outage. At 0957, Operators (utility, licensed) in the CPNPP Unit 2 Control Room received a Steam Generator (SG) 2-03 level deviation alarm. SG 2-03 level continued rising, and Operators (utility, licensed) took manual control of the SG 2-03 Feedwater flow control valve [EIS: (SJ) (FCV)], but they were unable to control feed flow. At 0958, a manual reactor trip was initiated in anticipation of an automatic turbine trip at the P-14 setpoint. The Motor Driven Auxiliary Feedwater (AFW) pumps were manually started per Operations procedures to control AFW flow, minimize cool down, and maintain SG levels. All systems responded normally during and following the trip.

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL PERSONNEL ERROR

Operators (utility, licensed) in the Unit 2 Control Room received a SG 2-03 level deviation alarm.

II. COMPONENT OR SYSTEM FAILURES**A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE**

A failure analysis determined that the SG 2-03 Feedwater flow control valve malfunctioned due to a degraded positioner upper O-ring. The positioner upper O-ring failed due to hardening and compression set. This was attributed to the valve manufacturer using an improper material for the valve positioner upper O-ring.

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B. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

The SG 2-03 feedwater flow control valve malfunctioned due to a degraded positioner upper O-ring. This O-ring separates the air supply port from the positioner outlet port. The faulty O-ring allowed supply air to bypass the upper plunger seat. The failure of this O-ring allowed supply air to pass uncontrolled through the positioner and provided approximately 45 psig to the actuator diaphragm, which kept the feedwater flow control valve open.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

The SG feedwater flow control valves regulate feedwater flow rates to the SGs from approximately 20 percent to full power. These valves also have a safety function to close to provide backup isolation of Main Feedwater flow to the secondary side of the steam generators following a High Energy Line Break. During this event, when operators manually tripped the reactor, the flow control valve solenoids de-energized allowing air to vent from the actuator and the 2-03 SG feedwater flow control valve performed its safety function to close.

D. FAILED COMPONENT INFORMATION

The SG 2-03 feedwater flow control valve is a 16 inch, carbon steel, globe valve. The valve is Model Number D-100 manufactured by Copes Vulcan Inc. The positioner is a Model 74 SG manufactured in April 2011 by Siemens.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

The Reactor Protection System actuated as required. The Motor Driven AFW pumps were manually started per Operations procedures to control AFW flow, minimize cool down, and maintain SG levels.

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

Not applicable - there was no safety system train inoperability that resulted from this event.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

This event is bounded by the CPNPP Final Safety Analysis Report (FSAR) accident analysis which assumes conservative initial conditions which bound the plant operating range and other assumptions which could reduce the capability of safety systems to mitigate the consequences of the transient.

Feedwater system malfunctions that result in an increase in feedwater flow are analyzed in section 15.1.2 of the FSAR. The system is analyzed to demonstrate plant behavior in the event that an excessive feedwater addition occurs due to a control system malfunction or operator error. The analysis assumes conservative initial conditions which bound the plant operating range and other assumptions which could reduce the capability of safety systems to mitigate the consequences of the transient. The FSAR analysis shows that the departure from nucleate boiling ratio encountered for an excessive feedwater addition at power is above the limit value and the feedwater malfunction event at no-load is bounded by the feedwater malfunction event at full power. The event of October 3, 2015, occurred at 43% reactor power, and all systems and components functioned as designed. A malfunction of the SG feedwater flow control valve positioner cannot affect the safety function of the valve to close to provide backup isolation of Main Feedwater flow to the secondary side of the Steam Generators following a High Energy Line Break. There were no safety system functional failures associated with this event.

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Based on the above, it is concluded that the health and safety of the public were unaffected by this condition and this event has been evaluated to not meet the definition of a safety system functional failure per 10CFR50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The Unit 2 reactor trip was due to a malfunctioning SG 2-03 feedwater flow control valve. The valve malfunctioned due to a degraded positioner upper O-ring. This O-ring separates the air supply port from the positioner outlet port. The degraded O-ring allowed supply air to bypass the upper plunger seat. This allowed supply air to pass uncontrolled through the positioner and provided approximately 45 psig to the actuator diaphragm, which kept the SG 2-03 feedwater flow control valve open.

V. CORRECTIVE ACTIONS

This condition only applies to the Siemens Model 74SG positioners that are used on the eight feedwater flow control valves (four in Unit 1 and four in Unit 2). Based on review of plant computer data, the demand signals for Unit 1 were normal which indicated this condition does not apply to the Unit 1 positioners. At the time of the failure, two of the Unit 2 positioners were scheduled to be replaced. As a conservative measure, all four of the Unit 2 feedwater flow control valve positioners were replaced.

As a part of the CPNPP Corrective Action Program, periodic monitoring of feedwater flow control valve demand as an early detection of a positioner failure has been established.

VI. PREVIOUS SIMILAR EVENTS

There have been no previous similar reportable events at CPNPP in the last three years.